THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1) A method of fusing first and second cells, the method including:
   a) Positioning the first and second cells between two electrodes in a fluid filled fusing container, the first and second cells being separated from each electrode; and,
   b) Applying a current having a predetermined waveform to the electrodes to generate a predetermined fusion pulse thereby causing the cells to fuse.
2) A method according to claim 1, the cells being held in suspension between the electrodes.
3) A method according to claim 1 or claim 2, the method including generating a DEP field, the DEP field being adapted to urge the cells towards each other.
4) A method according to claim 3, the predetermined waveform including a current representing the DEP field.
5) A method according to claim 3, the method including applying the DEP to a pair of second electrodes.
6) A method according to claim 5, the method including:
   a) Applying a DEP current to the pair of second electrodes;
   b) Positioning the first cell in the fusing container, the alternating field acting to attract the first cell towards one of the second pair of electrodes; and,
   c) Positioning the second cell in the fusing container, the alternating field acting to attract the second cell towards the first cell.
7) A method according to claim 6, at least one of the first and second cells being positioned in contact with at least one of the second pair of electrodes.
8) A method according to any one of the claims 1 to 7, the method including selecting the first and second cells using a pipette to extract:
   a) The first cell from a group of first cells held in a first container; and,
   b) The second cell from a group of second cells held in a second container.
9) A method according to claim 8, the method of positioning the first and second cells in the fusing container including:
   a) Using the pipette to position the first cell in the fusing container;
   b) Using the pipette to position the second cell in the fusing container, adjacent the first cell;
   c) Positioning the electrodes such that the first and second cells are located substantially between the electrodes.
10) A method according to claim 8 or claim 9, the pipette being coupled to:
   a) A drive system adapted to move the pipette with respect to the first, second and fusing containers; and,
   b) An actuator adapted to actuate the pipette to thereby expel or draw in fluid through a port;

The method including using a controller coupled to the drive system and the actuator to move and actuate the pipette.

11) A method according to claim 10, the method of selecting a cell including causing the controller to:

a) Move the pipette such that the port is adjacent a cell having predetermined characteristics, the cell being held in fluid suspension in the respective container;

b) Actuate the pipette to draw in fluid through the port, thereby drawing in the cell and the surrounding fluid.

12) A method according to claim 10 or claim 11, the method of using the pipette to position the second cell adjacent the first cell including causing the controller to:

a) Move the pipette such that the port is adjacent the first cell in the fusing container;

b) Cause the pipette to expel fluid through the port, thereby expelling the second into the fluid in the fusing container;

c) Move the pipette such that the port is as close as possible to both the first and second cells;

d) Cause the pipette to draw in fluid through the port, thereby drawing in the first and second cells and the surrounding fluid;

e) Cause the pipette to expelling the first and second cells into the fluid in the fusing container; and,

f) Repeat steps (c) to (e) until the first and second cells are within a predetermined distance.

13) A method according to any of claims 1 to 12, the electrodes being coupled to an electrode drive system adapted to move the electrodes with respect to the fusing containers, the method including using a controller coupled to the electrode drive system to position the electrodes in the fusing chamber.

14) A method according to any one of claims 1 to 13, the electrodes being coupled to a signal generator, the method of applying the current to the electrodes including causing the signal generator to apply a predetermined current to the electrodes.

15) A method according to claim 14, the first and second cells having a respective cell type, the method including using a controller coupled to a signal generator to select the current in accordance with the cell types of the first and second cells.

16) A method according to claim 15, the first and second cells being the same type of cell and the first and second group of cells being the same group.

17) A method of fusing first and second cells, the method being substantially as hereinbefore described.

18) Apparatus for fusing first and second cells, the apparatus including:

a) A fluid filled fusing container;

b) At least two electrodes adapted to be positioned in the fusing container in use;

c) A selector for:

i) Selecting a first cell from a group of first cells held in a respective container; and,

ii) Selecting a second cell from a group of second cells held in a respective container;

iii) Positioning the first and second cells in the fusing container between the electrodes; and,

d) A signal generator coupled to the electrodes, the signal generator being adapted to cause a field having a predetermined waveform to be generated between the electrodes, thereby causing the cells to fuse.

19) Apparatus according to claim 18, the selector being a pipette.

20) Apparatus according to claim 19, the apparatus further including:

a) A drive system adapted to move the pipette with respect to the first, second and fusing containers; and,

b) An actuator adapted to cause the pipette to expel or draw in fluid through a port.

21) Apparatus according to any one of claims 18 to 20, the electrodes being coupled to the fusing container.

22) Apparatus according to any one of claims 18 to 20, the apparatus further including an electrode drive system adapted to move the electrodes with respect to the fusing containers.

23) Apparatus according to any one of the claims 18 to 22, the current waveform including a fusion pulse, the signal generator being adapted to apply the fusion pulse to the electrodes to generate an electric field pulse thereby causing the cells to fuse.

24) Apparatus according to any one of the claims 18 to 23, the current waveform including a DEP current, the signal generator being adapted to apply the DEP current to the electrodes to generate a DEP field thereby urging the cells towards each other.

25) Apparatus according to any one of the claims 18 to 23, the apparatus including a pair of second electrodes, the pair of second electrodes being coupled to a second signal generator, the second signal generator being adapted to generate a DEP current, the DEP current being applied to the pair of second electrodes to generate a DEP field thereby urging the cells towards each other.

26) Apparatus according to claim 25, the pair of second electrodes being provided on the fusing container surface.

27) Apparatus according to claim 18 to 26, the apparatus further including a controller adapted to control the fusing of the cells by controlling operation of at least one of:

a) The pipette;

b) The electrodes; and,

c) The signal generator.

28) Apparatus according to claim 27, the controller including a processor coupled to at least one of:

a) The drive system and the actuator, the processor being adapted to move and actuate the pipette;

b) The electrode drive system, the processor being adapted to move the electrodes; and,

c) The signal generator, the processor being adapted to cause the signal generator to generate an electrical current having the predetermined waveform.

29) Apparatus according to claim 28, the controller including a detector adapted to detect the position of cells within the containers, the processor being responsive to the detector to move at least one of the electrodes and the pipette in response to the position of detected cells.

30) Apparatus according to claim 28 or claim 29, the processing system including an input for receiving input commands from a user.

31) Apparatus according to claim 30, the processor being coupled to a store for storing waveform data representing a number of different predetermined waveforms, the processor being adapted to select one of the number of predetermined waveforms in response to the input commands received from the user.

32) Apparatus according to claim 30 or claim 31, the processor being adapted to move at least one of the electrodes and the pipette in response to the input commands received from the user.

33) Apparatus according to any of claims 27 to 32, the controller being adapted to cause the cells to fuse by causing the apparatus to perform the method of any of claims 1 to 17.

34) Apparatus for fusing first and second cells, the apparatus being substantially as hereinbefore described.

35) A controller for controlling apparatus for fusing first and second cells, the apparatus including:

a) A fluid filled fusing container;

b) At least two electrodes;

c) A selector;

d) A signal generator coupled to the electrodes;

Wherein, in use, the controller is adapted to cause the cells to fuse by:

i) Causing the selector to:

(1) Select a first cell from a group of first cells held in a respective container; and,

(2) Select a second cell from a group of second cells held in a respective container; and,

(3) Position the first and second cells in the fusing container between the electrodes, the first and second cells being held in suspension; and,

ii) Causing the signal generator apply a field having a predetermined waveform to the electrodes, thereby causing the cells to fuse.

36) A controller according to claim 35, the controller being further adapted to position the electrodes in the fusing container.

37) A controller according to claim 36, the controller including processor coupled to at least one of:

a) A drive system adapted to move the pipette with respect to the first, second and fusing containers;

b) An actuator adapted to cause the pipette to expel or draw in fluid through a port;

c) An electrode drive system adapted to move the electrodes with respect to the fusing containers; and,

d) The signal generator.

38) A controller according to claim 37, the controller including a detector adapted to detect the position of cells within the containers, the processor being responsive to the detector to move at least one of the electrodes and the pipette in response to the position of detected cells.

39) A controller according to claim 37 or claim 38, the controller including an input for receiving input commands from a user.

40) A controller according to claim 39, the processor being coupled to a store for storing waveform data representing a number of different predetermined waveforms, the processor being adapted to select one of the number of predetermined waveforms in response to the input commands received from the user.

41) A controller according to claim 35 or claim 40, the processor being adapted to move at least one of the electrodes and the pipette in response to the input commands received from the user.

42) A controller according to any one of the claims 35 to 41, the current waveform including a fusion pulse, the controller being adapted to cause the signal generator to apply the fusion pulse to the electrodes to generate an electric field pulse thereby causing the cells to fuse.

43) A controller according to any one of the claims 35 to 42, the current waveform including a DEP current, the controller being adapted to cause the signal generator to apply the DEP current to the electrodes to generate a DEP field thereby urging the cells towards each other.

44) A controller according to any one of the claims 35 to 42, the apparatus including a pair of second electrodes, the pair of second electrodes being coupled to a second signal generator, the controller being adapted to cause the second signal generator to generate a DEP current, the DEP current being applied to the pair of second electrodes to generate a DEP field thereby urging the cells towards each other.

45) A controller according to any of claims 35 to 344, the controller being adapted for use with apparatus according to any one of the claims 18 to 34.

46) A controller according to claim 45, the controller being adapted to cause the apparatus to perform the method of any of claims 1 to 17.

47) A controller for controlling apparatus for fusing first and second cells, the controller being substantially as hereinbefore described.

48) A computer program product for controlling apparatus for fusing first and second cells, the computer program product including computer executable code which when executed by a suitable processing system causes the processing system to operate as the controller of any one of the claims 35 to 47.

49) A computer program product according to claim 48, the processing system being adapted to cause the apparatus to perform the method of any of claims 1 to 17.

50) A computer program product for controlling apparatus for fusing first and second cells, the computer program product including computer executable code which when executed by a suitable processing system causes the processing system to operate substantially as hereinbefore described.

51) A pipette system for manipulating particles, the pipette system including:

a) A nozzle for containing fluid in use, the nozzle including a port;

b) An actuator coupled to the nozzle, the actuator being adapted to draw in and/or expel fluid through the port; and,

c) An electrode coupled to the nozzle adjacent the port, the electrode being adapted to cooperate with a second electrode to allow an electric field to be applied to coupled to one or more particles positioned adjacent the port.

52) A pipette system according to claim 51, the electrode being formed a conductive tube.

53) A pipette system according to claim 52, the electrode being formed from a stainless steel tube having a diameter of approximately 10mm.

54) A pipette system according to any one of the claims 51 to 53, the pipette system including a drive system adapted to move the pipette system to be with respect to a fluid filled container to thereby allow particles to be positioned in or removed from fluid in the container.

55) A pipette system according to claim 54, the pipette system including a signal generator coupled to the electrode for generating a predetermined electric field between the electrode and a second electrode positioned in the container.

56) A pipette system according to claim 55, the pipette system including a controller adapted to control the drive system, the actuator and the signal generator to thereby apply an electric field to a particle by:

a) Positioning the particle in the container adjacent the second electrode using the pipette;

b) Positioning the pipette port adjacent the particle in the container; and,

c) Activating the signal generator.

57) A pipette system according to claim 56, the controller being adapted to fuse cells, by:

a) Positioning a first cell in the container adjacent the second electrode using the pipette;

b) Positioning a second cell in the container adjacent the first cell using the pipette;

c) Positioning the pipette port adjacent the first and second cells, such that first and second cells are substantially between the electrodes; and,

d) Activating the signal generator to cause a predetermined field sequence to be applied to the cells, thereby causing the cells to fuse.

58) A pipette system according to any one of the claims 51 to 57, the pipette system further including:

a) A radiation source; and,

b) A waveguide having a first end coupled to the radiation source and a second end coupled to the nozzle adjacent the port to thereby allow radiation from the radiation source to impinge on particles positioned adjacent to the port in use.

59) A pipette system according to claim 58, the pipette system including a detector, the detector being adapted to detect radiation emitted by the particle.

60) A pipette system according to claim 59, the detector being coupled to the first end of the waveguide, to thereby detect radiation emitted from the particle.

61) A pipette system according to any one of the claims 58 to 60, the radiation source being a laser.

62) A pipette system according to any one of the claims 58 to 61, the waveguide being a fibre optic cable.

63) A pipette system according to any one of the claims 58 to 62, the waveguide being formed from the nozzle, the nozzle including a shaped portion to allow the radiation from the radiation source to enter the nozzle and pass along at least a portion of the nozzle, the radiation being emitted from the nozzle through the port.

64) A pipette system according to any one of the claims 58 to 63, the pipette system including a controller adapted to perform at least one of:

a) Activating the actuator to thereby cause fluid to be drawn in and/or expelled through the port; and,

b) Activating the radiation source, to thereby expose a particle to radiation.

65) A pipette system according to claim 54 and claim 64, the drive system being coupled to a controller, the controller being adapted to recover particles having predetermined properties from the container by:

a) Positioning the pipette system such that the port is adjacent to a particle;

b) Activating the radiation source to thereby expose the particle to radiation;

c) Detect any radiation emitted by the particle;

d) Determine if the particle has the predetermined properties in accordance with the detected radiation; and,

e) In accordance with a successful comparison, activate the actuator to thereby draw fluid into the nozzle through the port, thereby recovering the particle.

66) A pipette system according to any one of the claims 51 to 63, the actuator including:

a) A fluid reservoir;

b) A flexible tube coupling the nozzle to the fluid reservoir;

c) An arm positioned so as to partially compress the tube;

d) An actuator drive system adapted to move the arm so as to perform at least one of:

i) Further compressing the tube to thereby expel fluid from the port; and,

ii) Decompressing the tube to thereby draw fluid in through the port.

67) A pipette system according to claim 66, the actuator drive system including:

a) A first actuator drive for moving the arm with respect to the tube and/or bladder; and,

b) A second actuator drive formed from an arm end portion, the arm end portion being in contact with the tube in use, the second actuator drive being adapted to cause the arm end portion to expand or contract.

68) A pipette system according to claim 66 or claim 67, the pipette system including a controller coupled to the actuator drive system, the controller being adapted to operate the actuator drive system to thereby draw fluid in or expel fluid through the port.

69) A pipette system according to claim 54 and claim 68, the drive system being coupled to the controller, the controller being adapted to recover particles from the fluid by:

a) Positioning the pipette system such that the port is adjacent to a particle; and,

b) Activate the actuator drive system to thereby draw fluid into the nozzle through the port, thereby recovering the particle.

70) A pipette system according to any one of the claims 63 to 69, the tube being formed from silicon tubing.

71) A pipette system for manipulating particles, the pipette system being substantially as hereinbefore described with reference to the accompanying drawings.